



Materials Engineering Branch

TIP*



No. 072 Product Re-Qualification

Author(s): Frederick C. Gross

Contact: (301) 286-6882

Most commercial spacecraft products are sold with little or no information about the formulation or the processing of the material. There are many case histories of spectral grade solvents being sold with objectionable contaminants in them or of bolts failing after installation due to hydrogen embrittlement even though they were sold as being free of residual hydrogen. It is quite common that a batch of a specific organic material will pass the NASA vacuum outgassing test and another batch of the same material will not. Similarly some lots of a metal alloy may be correctly heat treated, while other lots of the same alloy are sold with a different or incomplete heat treatment. It is possible that a discrepant material, discovered on one contract, may be sold on another contract instead of being scrapped. Manufacturers may, and often do, change the formulation or processing of a material without notifying the consumer.

As a result of these variations from lot to lot, it is very important that the purchaser and user of spacecraft materials perform periodic re-evaluations of products being used, especially in critical applications. It is undoubtedly more cost-effective to employ more complete incoming inspection than to correct post fabrication failures or problems.

Such an inspection may require destructive examination of a random sample of each lot used. It also means that each lot of organic material that is selected for use on space flight hardware should be screened or tested to ascertain the integrity and correctness of material's certification. This may be accomplished by testing some physical property such as hardness or strength of a metal. For organic materials, characterization of the outgassing behavior is often the preferred test.

Reference to such outgassing compilations as NASA RP 1124 (Rev. 4), JSC 08962 and <http://outgassing@nasa.gov> are useful sources of outgassing compilations, but these data do not necessarily mean that all batches of that material will perform similarly.